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AMERICAN ASSOCIATION.

The forty-sixth meeting of the American Association for the Advancement of Science was held in Detroit, beginning with the Council Meeting on August 7th and continuing throughout the following week.

Owing to the decease of the retiring President, Professor Edward D. Cope, and the absence on account of illness of the President-elect, Professor Wolcott Gibbs, of Harvard University, the senior Vice-President Professor W J McGee presided as acting-President during the meeting. His Honor Mayor Maybury and Hon. Thomas Palmer delivered addresses of welcome to the Association, to which acting-President McGee responded. The meeting was important scientifically and delightful socially. About twenty foreign guests were present, members of the British Association, which held its meeting in Toronto the following week.

On Monday evening, at the time and place when the retiring President's address would have been given, Professor Theodore Gill, of Washington, delivered a memorial address on the life and work of Professor Edward D. Cope. The important part which Professor Cope had taken in researches relating to the vertebrate palæontology of America was reviewed, and his work was compared with that of Cuvier, Owen and Huxley.

Professor W J McGee, of Washington, delivered his Vice-Presidential address before the Section of Anthropology on the subject of "The Science of Humanity." "The chief subject of thought among all races," he said, "is humanity in some of its numberless aspects." In tracing the origin and development of the science of anthropology, which includes the "Science of Humanity," he stated that mathematics is the oldest of the sciences and began before history. Astronomy was nearly contemporaneous; then followed physics and chemistry. These four branches of knowledge, for many years, constituted science. Later, attention was attracted by things nearer to mankind, and thus botany and zoölogy arose. As a rule observation and research, in all branches of science, begin with the rare, the remote, and the abnormal, and develop toward the common, the near, and the normal. Thus it is within a generation or two that the plants and animals, which supply mankind with food and clothing and other necessities and conveniences of life, have been subjected to scientific

research. Geology, he said, began soon after botany and zoölogy with the study of rare minerals and the ancient rocks of remote mountains; and last of all, man himself became the object of scientific research. Here, too, the science began with the study of the savage, the native of distant lands, and the physically abnormal.

In the earlier classifications, the study of anthropology was based on bodily or somatic features, while the more advanced among current classifications rest either on collective attributes or on the activities of the human groups—*i. e.*, the older classifications indicate what men are, the newer indicate what men do. Professor McGee classes somatology, ethnology and psychology under physical anthropology,—the science which treats of man as an animal. He admits, however, that psychology “pushes beyond the domain of biology.” The branches which relate to the intellectual side of man he enumerates as follows: “The fine arts or esthetics, giving basis for Esthetology; industries, forming the object-matter of Technology; organizations or institutions, affording foundation for Sociology; language and literature with their science of Philology; and the great plasma of knowledge, forming the ill-defined but all-important object-matter of Sophiology.” He called attention to the fact that these five branches had recently been combined under the term “Demonomy,” and this system of organized knowledge, he thinks, may fitly be designated the “Science of Humanity.” In the words of the author: “The importance and distinction of humanity are indeed such that it behooves naturalists to reorganize a fourth realm or world—to extend science from the realms of the mineral, the vegetable, and the animal into the incomparably broader and richer realm of the purely human; and this extension is the chief end of modern Anthropology.”

Miss Alice C. Fletcher read a paper in Section H, giving the results of her investigations on the “Import of the Totem” among the Omaha Indians. “There are two classes of totems known among the Omahas: the personal, belonging to the individual; and the social, that of societies and gentes.” Among these Indians the totem is not inherited from ancestors nor bestowed by any living person, but is obtained through a revelation which comes to the individual in a vision, after a period of solitary fasting and prayer. The object that is revealed to him is “ever after the most sacred thing he can ever possess, for by it his own powers are so reinforced as to give him success as a hunter, victory as a warrior, and even the power to see into the future.” The Indian believes that all objects, animate or inanimate, have a continuous life and an

intelligent will power. He believes that this will power is able "to make or bring to pass," and he names it "Wa-kon-da and offers his prayers to it." Miss Fletcher's researches have yielded no evidence that he regards this power as a supreme being or that he has "ever conceived of a single great ruling spirit." The author referred to the firm belief of the Indian in will power; she described his custom of singing certain songs by which thought and will could be projected to help a friend or harm a foe; she said that the members of the Hon-he-wachi Society were in the habit of directing their combined will power against an obnoxious person in the tribe for his destruction. Believing as he does that all objects in nature have this power in some form, the Indian prays to the wind for health, to the stone for strength, to the elk for speed, and so on. The significance of the totem of a society was the grouping together of those who had received similar visions. In the gentes it meant that "the individual belonged to a definite kinship group, from which he could never sever himself without incurring supernatural punishment." The name of a gens indicated its totem.

Mrs. Zelia Nuttall of Dresden sent to the meeting a paper on "Ancient Mexican Superstitions." In this paper she expressed regret that the exhibition of microcephalous idiots, natives of Central America, advertised as the last living representatives of the Aztec race, had given to the world the erroneous idea that this race was a hideous one and now extinct. Four-sevenths of the population of Mexico is Indian, and the Aztec race is represented by thousands endowed with fine physique and intelligence. Fray Diego Duran, a Spanish monk who spent his life among the Indians of Mexico, speaks of these Aztecs as belonging to the most polished or cultured race; he speaks of the strong love of the parents for their children; and refers to their earnestness in braving indescribable sufferings to obtain immortality for their souls in the heavenly "Mansion of the Sun." The human sacrifices practiced by the ancient Mexicans have been exaggerated, and these sacrifices were performed as religious ceremonies, "deemed so solemn and holy that it could be worthily performed by the high priest only, in the presence of an awe-stricken community." This is "the only blot or defect which the Spaniards were able to detect in a civilization which was so admirably organized in every other way."

The superstitions and folk-lore collected by the old Spanish authors are interesting as giving glimpses of every-day life in the Mexican household before the arrival of the Spaniards. From her study of these old Spanish writers, Mrs. Nuttall describes many of

the customs of the Aztecs; such as, the offering of libations and food to the god of fire before eating and drinking and when entering a new house; and the ceremony called, "eating the earth in honor of the gods"—bending low and touching the ground with either the index or middle finger and carrying it to the tongue and licking it—which they performed on entering a sacred temple, on entering their own homes, and when taking an oath.

Vice-President I. C. White's address, before the Section of Geology and Geography, was a carefully considered account of the Pittsburgh Coal Beds, which stand preëminent among the mineral deposits of the great Appalachian field, and are regarded as "the last of the great coal-making epochs of carboniferous time." In area of marketable coal this bed in Pennsylvania, Ohio, West Virginia and Maryland is probably about 6,000 or 7,000 square miles.

The problem of the Great Lakes was treated in an interesting manner by Professor H. L. Fairchild, Dr. J. W. Spencer, Messrs. Frank Leverett, G. K. Gilbert and F. B. Taylor. Several statements of popular interest were made, during the reading of these papers. Investigations have proved that before the glacial period the region of the Great Lakes presented geographical features similar to those of the country south of them to-day. In those days the water courses flowed mostly toward the north. There were no great lakes. The measurements of the U. S. Geological Survey show a rising of the land at the north and northeast as compared to that at the south and southwest. The whole lake region is being tilted toward the south-southwest. The land at the northern shores rises five inches in a century. The mean level of the water of Lake Michigan at Chicago rises at the rate of ten inches in a century. It is estimated that in about 3,000 years the Niagara River will run dry, and all the waters of the Great Lakes will flow over Detroit and Chicago and empty into the Mississippi River.

One of the most interesting events of the meeting was the symposium on the subject of Early Man in the Delaware Valley held at a joint session of the Sections of Geology and Geography and Anthropology. Mr. G. N. Knapp and Mr. H. B. Kummel gave papers on the geological side of the question, declaring their opinion that the deposit at Trenton where the chipped argillite implements are found is of "wind origin," having accumulated since the river had cut its trench below the level of the upper Trenton terrace. It was admitted that this theory was open to some difficulties and not capable of absolute demonstration.

The Chair then called upon Professor F. W. Putnam to open the discussion of the session by the presentation of his paper on "Early Man of the Delaware Valley," giving a general statement of the work that has been done in the valley. Professor Putnam first made allusion to Dr. C. C. Abbott who, as far back as 1869, published an account of the finding of implements in the gravels at Trenton, New Jersey. At first these implements were accepted as being of the same character as those found in the gravels of the Old World. Afterward the theory was advanced that these implements were simply rejects from the manufacture of implements of a higher character. Then geologists began to express doubts about the age of the gravel; and certain parties claimed that the implements had been found on the surface, or if in the gravel that they got there by accident. "Then the discussion grew a little warm; then a little warmer; finally it got very hot, and personalities crawled into it."

Professor Putnam, himself, has made several examinations of the Trenton gravels, and in 1876 he succeeded in finding one of the rude argillite implements directly back of a boulder in what he still considers undisturbed gravel. Then a second discussion of the question of early man in the Delaware Valley arose. In 1883 Dr. Abbott published a statement that while in the first foot of the surface soil there is to be found a large number of implements made of chert, quartz and jasper, as well as various objects belonging to the recent Indian occupation, in the lower undisturbed soil there is to be found a large number of implements made of argillite and seldom those made of any other material. Professor Putnam considers that "the accumulation of evidence of the existence of what might be called an argillite period before the time of the Indian occupation has been going on from the time Dr. Abbott first mentioned the subject. Thousands of these argillite implements have been collected, and in the Peabody Museum you may see large collections representing respectively the argillite period and the Indian period." Professor Putnam has directed exploration in the gravels of Trenton for about twenty years. Several thousand dollars have been contributed by friends of scientific research for this work, which was first carried on for the Peabody Museum, then for the World's Columbian Exposition, then again for the Peabody Museum, and for the past year through the liberality of the Duke of Loubat for the American Museum of Natural History. For several years Mr. Ernest Volk has been in charge of the work at Trenton. Professor Putnam described in detail the explorations in Lalor Field, situated on a bluff

on the limits of Trenton, where trenches have been dug over half a mile in length and fifty feet in width. At this place, by invitation of Professor Putnam, three meetings of archæologists and geologists took place in June and July of this year for the purpose of witnessing the digging of trenches and of making personal examinations of the deposits and their contents. Professor Putnam stated that he was intentionally absent from these meetings in order that the members of the parties might be perfectly free to make their own investigations. During these several meetings implements were found, in place, in the presence of every member of the party. It was to discuss the results of these meetings at Trenton that the symposium was held at the Association meeting. In referring to this occasion Professor Putnam said: "There can hardly be any doubt that these specimens and a number of others that we have at the New York Museum and at the Cambridge Museum were actually found in place in the deposit . . . and I am perfectly satisfied that the objects were placed there somehow at the time the alternate layers of sand and other materials were deposited. Whatever is the age of the red clayey layers or of the sand above and below them, that is the age of these implements. That is a question outside of archæology. That is what the geologists must determine for us." Professor Putnam thinks that man must have been somewhere on the Continent to have reached this region so soon after the glacial period; and the finding of many thousand of argillite implements shows that this locality was thickly populated at that early time. In closing, the Professor said that in entering on this research he had determined to make such a thorough investigation that the truth must come out. He desired only to learn the facts and let the facts tell their own story, whatever that might be.

Professor G. Frederick Wright was next called upon to present his paper entitled "Description of Relics from the Sand Deposit on the Lalor Farm." Professor Wright was a member of the first party that visited Trenton this summer. He gave an account of the discoveries made at that time on the Lalor Farm. He described and exhibited implements which were found 35 inches below the surface of the fifty-foot terrace of Trenton gravel and beneath the distinct red stratum of clay which was perfectly undisturbed. He considers that the deposition of the implements, therefore, preceded the formation of this red stratum. The stratum contained numerous pebbles from five inches to a quarter of an inch in diameter, and it is the opinion of Professor Wright and of Professor Hollick (who was also a member of the Trenton party) that this is a water

deposit. Professor Wright connects it with the closing stages of the glacial floods. In what were believed to be undisturbed layers, at higher levels, there is such an abundance and preponderance of the argillite implements as to confirm the theory that an argillite culture preceded that of the jasper and quartz in the Delaware Valley.

The next paper called for was that of Professor W. H. Holmes, who was a member of the second party to visit Trenton. He dwelt on the occupation of the Delaware Valley by the historic Indians; and he attributes all the implements found at whatever depth and under whatever conditions to these Indians. He believes in the great antiquity of man in America, but he does not believe in connecting man with the Trenton gravels. He doubts the glacial age of these gravels; and even should they prove to be glacial he would still believe that the finding of implements within them is not a proof of the existence of palæolithic man, as he thinks the objects may have been introduced accidentally. Moreover, he declares all the implements to be of neolithic type.

The Chairman next called for the paper by Mr. H. C. Mercer. This paper gave an account of the opening of trenches in the presence of the author and of the finding of implements in the sand below the black soil. "Casting out such of these as pertained to the uppermost five or six inches of the layer, we concentrated attention upon the others, which appeared to rest in the sand beyond the downward reach of reasonable intrusion from above." After considering the evidence on both sides of the question from his own observation, he came to the conclusion "not only that a significant number of the artificial chips are human artifacts, but that they rest beneath undisturbed films of stratification and had not been intruded from the Indian layer above." He did not attempt to fix the date of occupation indicated by the presence of these implements, but thought that should be left for investigation.

Dr. Thomas Wilson's paper, in his absence, was read by Prof. Putnam. Dr. Wilson described the three layers which he saw exposed in the pits dug at Trenton: "(1) The black soil on the surface eight to twelve inches thick; (2) yellow sand, with irregular red streaks through it, about 30 inches in thickness; (3) stratified sand and gravel for an indefinite depth, and believed to be down to the blue clay. The pits were only opened through the two upper layers, although holes were dug at the bottom temporarily for the purpose of identifying the line between the yellow sand and the gravel." Dr. Wilson claimed that during his visit no reference was made to palæolithic man. "The stratum

to which palæolithic objects are claimed to belong and wherein they have been found was not examined nor considered." He believes that the second layer gives evidence of a different occupation from the first or surface layer, and he corroborates the statement made by Dr. Abbott, Professor Putnam, Professor Wright, and others that there is evidence of an "earlier occupation of the territory with a different culture, at least a different industry, from that of the Indian."

The Chairman then called on Professor Salisbury of Chicago for his opinion on the geological side of the question. His paper was entitled "The Age of the Implement-bearing Sands of Trenton, New Jersey." Professor Salisbury made a statement in relation to the geological deposits in the vicinity of Trenton, and then said, "The Delaware has its flood plain less than ten feet above the level of the sea. The face of the bluff is about fifty feet in height. Further south the bluff becomes lower. The plain was never elevated to the same extent. The sands and gravels are largely of northern materials. They are of the last glacial age. Over the surface of this plain there is a little loam, a foot and a half, and two feet now and then, with pebbles in it, but it is often without. The origin of the loam is somewhat problematical. I am unable to say whether it is the last phase of the deposition, or whether it is the fine material from below largely brought up by ants and worms. Furthermore, I am unable to say it may not have been under sea water since the last glacial epoch. There are several possibilities. . . ." Further on, the author comes to the special section where the trenches were made; in the first place they are on the edge of the bluff, not back. The thickest of all the materials overlying the materials which are clearly glacial is something like three feet. The section is made up of a soil, then follows the yellow sand. Coming to the origin of the sand, the author gave three possible hypotheses: the first that it is of glacial age and fluvial origin; the second that it is of post-glacial age and estuarine origin; the third that it is post-glacial and eolian. He is unable to name the age or the origin of this sand, and sees no way of determining it. "It seems certainly not earlier than the last glacial epoch. Certainly there is grave doubt about its being glacial in age." He does not know exactly what the red streaks mean, but does not admit any lines of stratification in the deposit. On the contrary, he believes it has been completely disturbed by surface agencies and by the borings of insects, worms and burrowing mammals.

In the discussion following this paper Professor Wright asked why the tree roots did not disturb the red band. He had examined this red band for a distance of twenty feet and "certainly there has been no disturbance since those implements were deposited below that red band." Professor Putnam expressed much satisfaction at the immense antiquity indicated by the theory of Professor Salisbury in regard to the disturbance of the layer by the agency of burrowing insects, worms and small mammals and the growth and decay of tree roots. He called attention to the great length of time it would take for the ants and worms to bring the sand to the top, and for the several agencies to break up the layers and work over the material. He said: "From everything that has been said to-day it seems to me that a considerable antiquity is admitted for this deposit. I will not say glacial, but a considerable antiquity. That is all the archæologist expects."

Professors Chamberlain, Claypole, Monroe, Mr. Gilbert and others joined in the discussion, which was marked throughout with perfect order and good nature. Professor Putnam remarked that he felt repaid for his twenty years' research in this line because one point seemed to be pretty generally conceded, namely, that there is evidence of an earlier occupation of the Delaware Valley than that of the historic Indian. He agreed with all present that the question of the existence of "glacial man in America" is still an open question, worthy of further investigation.

By special request of the committee in Toronto this discussion was repeated before the British Association at a joint meeting of the geologists and anthropologists, where it passed off in an equally happy manner and proved very interesting to the scientists and to the largest audience attending any section during the meeting.

At the last Council meeting of the American Association, Professor Putnam passed in his resignation of the office of Permanent Secretary, which he has held for twenty-five years. The resignation was accepted with regret and with many encomiums on his long and faithful work for the Association. He was then unanimously elected President of the Association for the meeting of 1898. This will be the Jubilee Meeting to celebrate the fiftieth anniversary of the Association. It will be held in Boston—the birthplace of the Association. The Boston Society of Natural History took the initiative in extending the invitations to the Association, and was most cordially reinforced by courteous invitations from the Governor in behalf of the State, the Mayor in behalf of the City, from Harvard University, and from all the learned and scientific institu-

tions in Boston and Cambridge. It is expected that there will be on that occasion an unusually large and brilliant gathering of scientists, including many distinguished foreigners, brought together in Boston to celebrate the achievements of fifty years of science in America.